## INFORMATION REPORT INFORMATION REPORT

## CENTRAL INTELLIGENCE AGENCY

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COUNTRY	USSR	REPORT		
SUBJECT	Iron and Steel Research and Development in the USSR	DATE DISTR.	5 <b>F</b>	ebruary 1959
	Development in the object	NO. PAGES	1	
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2. Attachment 1 contains information on the following aspects of steel development in the USSR: vacuum process steel, mechanical testing, and allow development.

3. Soviet development in the field of iron making is discussed in attachment which contains information on the following subjects: blast furnaces, continuous casting, and tin coating.

PLEASE ATTACHED

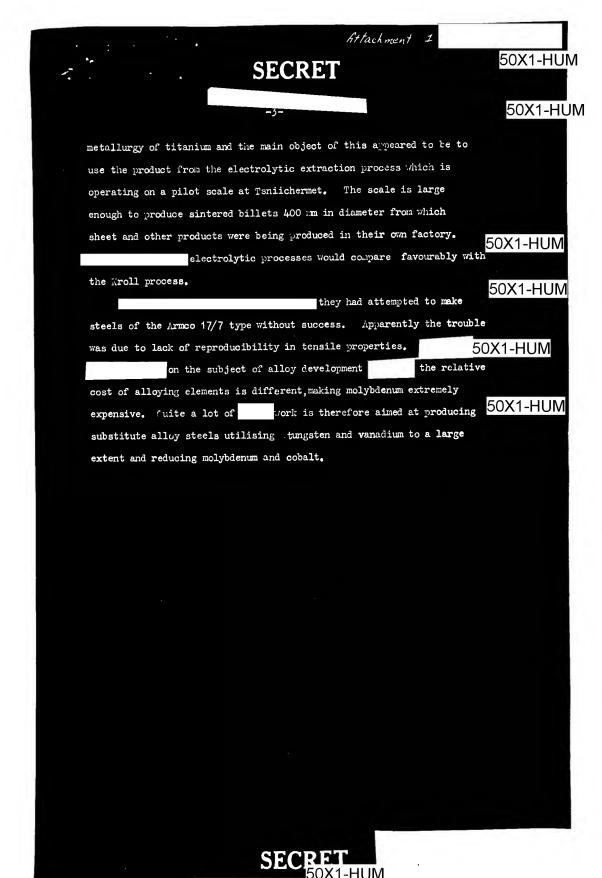
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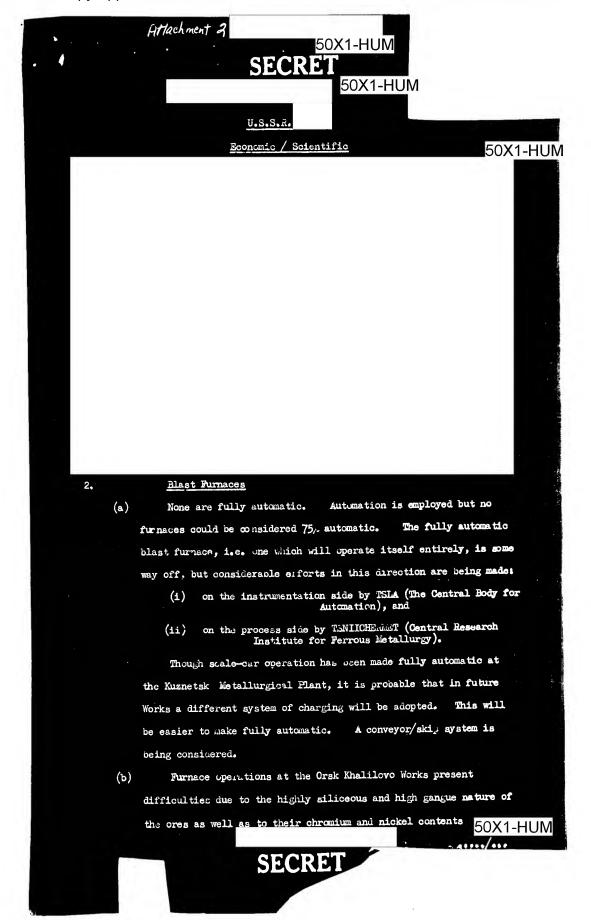
50X1-HUM SECRET
50X1-HUM
Iron and Steel esearch Development 50X1-HUM
(: etallurgy)
1. Vacuum Process Steel.  There appear to be major developments in both vacuum melting and vacuum
casting in .ussia. Probably the greatest development is in vacuum casting where
10 installations with capacities up to 50 tons each are
operation in Russia for the production of silicon transformer steels and aircraft
grade steels. These all appear to be simple ladle de-gassing processes and 50X1-HUM
apparently they are convinced of the merit of such treatments.
the total steel weight vacuum-treated annually is 200,000 tons. It is well
known that Samarin has been active in this field and consequently there has been
a large amount of research work carried out in the Baikov Institute, and probably
the largest tonnage of steel made is of silicon transformed steel. Both at the
Balkov Institute and at Taniichermet there are are vacuum melting units of 22" dia.
where the major interest has been in the production of ball bearing steels. Both
of these Institutes claim to have demonstrated the superiority of vacuum-melte 50X1-HUM
steel for this application, but commercial production could not
yet be justified commercially. The steels used are 1, C $1\frac{1}{2}$ Cr, with an addition
of $\frac{1}{2}$ . Si, $\frac{1}{2}$ In for large bearing sizes. It Isniichermet they have arrangements
where steels are made and processed for sale and certainly some of this steel has
been made into bearings. No results were available,
2. Lechanical Testing.
Research relating to high temperature tests in tensile machines and to
creep tests is probably being conducted at the Moscow Aviation Institute. The
interests of Tsniichermet on the other hand are predominantly never plant steels and are predominantly never plant steels.
reinforcing steels and recision stelle Gorge College Particular magnetic properties.

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. Attachment	
SECRET 50X1-HUN	/
50X1-HUI	VI
In contrast, the interests at the Baikov Institute are mainly connected	
with Nickel, titanium and niobium base alloys. Here there appears	
to be a large amount of work on binary and ternary alloy systems and	
a lot of the creep testing work was of a sorting nature using the	
centrifugal test machine designed by Professor Formilev. Apart from	
these creep machines all the other creep machines were of the standard 50X1-HU	JM
high sensitivity type	
there are only 800 to 1000 creep	
machines in Russia. There were approximately 150 creep machines both	
at Tsniichermet and the Baikov Enstitute. The Pajority of these were	
for operating temperatures up to 850 to 900°C but there were	t .
three special machines for use at 1200°C. more of 50X1-HU	JM
these high temperature machines were under construction.	
There appeared to be quite a large amount of fatigue testing using	
large pulsating machines which were of $100(^{\pm}15)$ , $200(^{\pm}50)$ and $600(^{\pm}75)$	16
tons capacity. On these maddines high temperature furnaces could be	
installed for high temperature operation. There was one machine of	
30 tons capacity where the complete machine was enclosed in a furnace.	
It is of interest that all these machines were manufactured by Schopper	
of Leipzig.	1
3. Alloy Development	-
As mentioned above there is a lot of work being done on nickel	
base precipitation hardening alloys and this work extends to detailed	
studies of the mechanism. they have not yet 50X1-HU	M
developed electron microscope techniques	4
Similar stages were also being made of tempering processes in alloy	
steels. [rofessor Homilov] 50X1-H	HUN
was using a combination of techniques such as not hardness and	
centrifugal fatigue testing to obtain preliminary information on a very	
extensive range of alloys.	
There appeared to be considerable interest in the powder	
SECRET /metallurgy	
50X1-H	.UM



50X1-HUM



Attachment 2 50X1-HUM 50X1-HUM There is not enough experience on the use of oxygenate (c) blast for sweel-making production to be able to say whether a 25, oxygen content led to a 25, production increase. The tests at Nova Tula, where some tests were made, are not really applicable to modern practice because of the small size of the furnace and the At this Works, however, poor quality of the raw materials. ferro-menumese production has doubled by the use of a 32,0 oxygen content. This large increase is, however, undoubtedly due to the beneficial action of oxygenation on cuke rate. There is no reason to expect such figures for steel-making pig iron production. In tests on the large furnace at the Mizhne-Tagil Commine, 24, was the highest oxygenation achieved and this gave a productivity increase of the order of 8, for steel making iron. 50X1-HUM production for ferro In general, manganese might se increased by 25% with a 25% oxygen content but this figure was too high for ordinary pig iron. 50X1-HUM A 1719 m3 blast furnace is in operation at Krivoi Rog. (a) a utilisation figure equal to C.7 could be considered as reasonable for "Southern practice"; thus a 1719 m blast furn ce should give a daily production of 2450 tons. however, that better figures would very likely e50X1-HUM be obtained. For instance, at Chelyavinsk, another furnace of equal caracity will shortly be blown in and production from this furnace is estimated at 2650 tons per day. 50X1-HUM Top blowing processes at TSLA are described in "STAL" 1957 (e) No.8, pages 693 - 700. These top blowing processes have been adopted at the Petrovskii and Krivoi Rog Works. the convertor shop at the Orsk Khalilovo **(f)** 50X1-HUM Plant used Bessemer converters. ..../ , . . . . . 50X1-HUM

	Attackment 2
•	SECRET 50X1-HUM
3•	Continuous Casting
). (a)	A new large plant is outlding at Stalino in the Donbas.
(a) (b)	a new project for a 250 ton continuous
(6)	casting plant will have an 8-strand machine
(c)	
	because of the rapid expansion of the Soviet steel industry.
	economies in a rapidly expanding industry could
	be effected by the saving of primary mill construction due to the 50X1-HUM
	in troduction of continuous casting.
	continuous casting was far more flexible than conventional methods.
	given the present rate of research and development enough experience
	will have seen accumulated by 1962 for a decision to be made as to
	whether primary rolling could safely be abandoned in favour of
	continuous casting techniques.
4.	Win Coating 50X1-HUM
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